



# A strategic approach to water and sanitation in disasters

## Introduction and scope

Disasters are either natural (caused by extreme weather, geophysical phenomena and epidemics) or man-made (as a result of technological disasters or conflict).

The number of people affected by natural disasters has tripled since the 1970s. The majority of these disasters occur in developing countries due to their geographical and geological characteristics. Similarly, the incidence of armed conflict or 'complex emergency' has increased globally, with widespread disruption exacerbating poverty levels.

Developing country populations are particularly vulnerable to these events, having a high level of exposure and less capacity to cope with the effects. 'Disaster vulnerability' can therefore often be a greater risk than the hazard itself. This vulnerability is equally seen in war situations, which leave people at risk of disease, famine and unsafe living conditions.

An essential component of an emergency response is to ensure access to safe water and adequate sanitation. This note considers the issues surrounding emergency access to water and sanitation, and discusses subsequent approaches to rehabilitation and mitigation.



## Headline facts

- The number of disaster victims due to war or natural hazards has risen in the last 30 years to the current high levels, with developing countries being most affected.
- Relief aims to fulfil basic needs, providing minimum levels of well-being and preventing the spread of disease. Water and sanitation are particularly important to this, as lack of access to them can lead rapidly to the spread of communicable disease.
- Since the early 1990s, the 'relief system', involving a multitude of aid agencies, has imposed minimum standard mechanisms and a long-term approach to interventions.
- While there is pressure to respond rapidly to disaster, co-ordination is key to maximizing efficiency. Using local resources and labour, following consultation with the recipient population, ensures quick and appropriate actions.
- Once an emergency is over, rehabilitation of water and sanitation systems should prevent the degradation of facilities and the return to an emergency situation. Long term sustainability requires agencies to work with water utilities and communities.
- Institutional development, mitigation policies and law reforms can be achieved in the long term; however, relief agencies and funds often focus on the short term, which is at odds with the aim of improved water system rehabilitation.
- A pluralistic approach, perhaps involving community-managed water distribution or privatization, is necessary and uses the skills and experience of all actors.



## The Emergency Response

### Humanitarian accountability

Extensive media coverage can generate huge amounts of funds, such as in the case of the 2004 tsunami. This, coupled with the large number of new relief agencies established since the 1970s, has brought relief work under scrutiny. The concept of humanitarian accountability now recognizes the rights of recipients of relief and the obligations of those providing it. The Sphere Project produced a widely accepted charter and quality standards covering emergency water and sanitation, food security, shelter and health services.

### Linking relief and development

The main objective of development is empowerment and relief efforts have been criticized for creating dependency amongst recipients. Immediate assistance should take a long-term perspective towards regaining self-sufficiency. 'Rehabilitation' is now seen to be the way to link relief and development and to restore the same level of functionality of habitat, livelihoods and services that existed before the event.

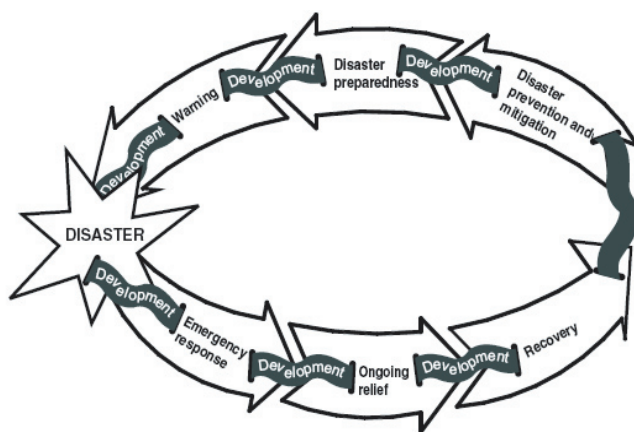


Figure 1: Disaster management cycle

As Figure 1 demonstrates, disaster management strategies should be intertwined with a development approach. This is more applicable to natural disasters as its linearity is incompatible with war-related emergencies.

### Essential needs: water supply and sanitation

Water and sanitation are amongst the first considerations in disaster response. Sufficient water is needed for drinking, cooking, washing and to maintain personal hygiene and a clean environment. Sanitation includes safe excreta disposal, drainage of wastewater and rainwater, solid waste disposal, vector control and, in the early stages, the disposal of dead bodies.



Emergency tapstand in Liberia

## Access to Water Supply and Sanitation

### Speed versus timeliness

Pressure to deliver assistance quickly can come from local authorities as well as the affected population. Objective threats, such as the imminent danger of epidemics, add to this.

However, timeliness is more important than speed, i.e. intervention should occur when it is needed. The immediate aftermath may be an inappropriate time for external agencies to assist, as local authorities and those affected are often more effective at this time. By rushing assistance, aid agencies may focus on victims only and overlook local capacities that can contribute to greater long-term efficiency.

Time should also be allowed for assessment: initially, a rapid assessment prior to intervention to evaluate and prioritize needs, plus a vulnerability assessment to ensure that existing inequalities are not replicated.

### Using local resources

In most cases, skilled and unskilled labour can be found among the disaster victims. Although water and sanitation system design and installation may require more technical expertise, the general lack of high-tech systems means that local labour can be used for digging wells and building latrines, providing faster recovery and greater rehabilitation of the community.

The involvement of community leaders is also important due to their influence and their knowledge of both local cultural and environmental issues. Local water sector institutions play an additional role, especially in and around urban areas. Water utilities may have suffered the effects of the disaster due to loss of assets, tools and personnel. Complex emergencies have a particularly detrimental effect on institutions, leading to disorganization, lack of income and limited government support.

The 2003 earthquake in Bam, Iran, killed 26,000 people, with 125,000 left homeless. Restoring water and sanitation services was a priority and the water utility managed to restore part of the water supply within a few days. Building toilets and showers was mostly the task of NGOs. Oxfam employed local masons for the repair and reconstruction of toilets and bathrooms. This approach could have been applied in other areas but other agencies preferred to rely on prefabricated cubicles, locally made or outsourced.



The level of intervention required by water utilities varies. They may take a lead role while needing external support, as was the case in Bam and in Gujarat following the 2001 earthquake. In war situations, water utilities are usually too weakened for this, although they can support international assistance operations. Their role can be vital where security conditions limit intervention by expatriate personnel, such as in Iraq and Chechnya.

### Co-ordination of aid agencies

Co-ordination of agencies is essential although difficult, due to competition for funds or media attention, and due to the large number of organizations involved and concerns over neutrality. The aim of co-ordination is to achieve more effective and efficient relief operations, avoiding duplication and ensuring that assistance is of uniform quality. The Sri Lankan experience illustrates the detrimental effects of unco-ordinated responses.

Many international aid agencies and local NGOs participated in the response to the 2004 tsunami. Despite abundant funds, competition for projects and media coverage resulted in agencies competing for beneficiaries, with a price increase for local manpower. The Sri Lankan government set up the 'Task Force for Rebuilding the Nation' (TAFRAN) to co-ordinate the reconstruction effort. Field workers found that TAFRAN was largely absent from the field and lacked authority. Consequently, some NGOs worked in fields for which they lacked experience, leading to poor practice such as pour-flush latrines being built without water supply and a general neglect of hygiene promotion activities.

NGOs were in turn criticized for acting independently from local authority and creating inequitable aid distributions. A survey by the Fritz Institute showed that only 30% of NGOs carried out needs assessments, resulting in a mismatch between supply and demand. A lack of warehousing facilities and inadequate transport resulted in 40% of families not receiving timely assistance.

Co-ordination for water supply and sanitation is imperative because of the technical complexity of systems. In addition, a co-ordinated approach allows the different organizational assets and expertise to be used efficiently with equal benefit for all.

### The importance of consultation

Although accountability in humanitarian action recognizes the need for consultation of beneficiaries and is reflected in the Sphere standards, those referring to ratios and numbers of facilities are more likely to be implemented than the need for consultation. Cultural factors and the needs of vulnerable groups should influence the design, numbers and location of water and sanitation systems.

Any design shortcomings are amplified for those living in relief camps, so consultation is particularly important. Residents' priorities may vary between different groups and it is important that their representatives are invited to discuss these and be involved in any decisions made.

Finally, conditions of use and basic maintenance of shared facilities have to be managed by users in most cases. This covers access to water points, cleaning of toilets and drains and the organization of refuse collection. Consultation with communities is required before the systems are built, in order to ensure that they are used in a sustainable fashion.



Toilet construction in Bam

## Approaches to Rehabilitation & Mitigation

### The road to reconstruction

Once the emergency is over, rehabilitation can take place in preparation for reconstruction. Five basic elements of rehabilitation are:

- Access to basic services
- Empowerment to restore livelihoods
- Infrastructure strengthening
- Resource mobilization
- Risk reduction by mitigation policy.

The basic principle is to prevent systems' deterioration which would result in a return to an emergency situation.

Preventative maintenance of water networks includes: adding extra chlorine to water to kill pathogens; maintaining constant network pressure; and configuring sewers to keep wastewater away from water pipes. If these measures are not carried out speedily, the level of infrastructure functioning may fall below the emergency threshold, requiring further efforts to stabilize the situation (Figure 2).

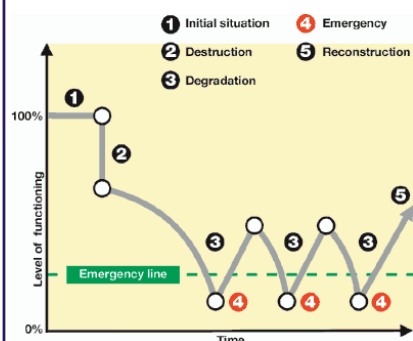


Figure 2: Recurrent emergencies

It is important to consider sustainability and coverage when designing rehabilitation projects. Technical sustainability requires technology to be appropriate for the local environment and easily sourced. A holistic approach should also be taken to ensure that the work is co-ordinated between different parts of the same network and between other urban services such as power supply etc.

Sustainability is also linked to the overall capacity of water utilities to run systems and covers issues such as operation and maintenance, managerial capability and cost recovery. Finally, community empowerment ensures that accountability mechanisms operate between utilities and customers.

## Strengthening communities and institutions

A holistic approach which considers the needs of communities and institutions is particularly important in urban areas affected by armed conflict. Organizations in charge of large rehabilitation projects have to deal with major changes caused by conflict: damaged or destroyed infrastructure; increases in population; corrupt or inefficient water utilities; and impoverished communities.

### *Facilitating works in Sarajevo and Jaffna*

10% of Sarajevo's water supply used to come from springs located near Pale in Serb-held territory. In 1994, the Red Cross sponsored the rehabilitation of this pipeline, with equipment purchased in Serbia. Although the technology was out-dated, local engineers were familiar with it. It also avoided importing material into a country under UN sanctions. The Red Cross ensured that the Works Department of Pale Municipality would work for the benefit of a Bosnian population, through negotiation with professionals from both parties.

In 1996, the German Development Cooperation (GTZ) launched the 'Jaffna Rehabilitation Project' to rebuild infrastructure and support local communities in this war-shattered area. The rehabilitation of Jaffna city water network was carried out through the Water Supply section of Jaffna Municipal Council in agreement with central government and equipment was transferred despite the restrictions.

Physical repair of infrastructure is comparatively easy. The real difficulties lie in implementing institutional strengthening and working at the community level to ensure cost recovery, in the face of the corruption and mistrust that exist in many war zones. One solution is to delegate some of the water utilities' role to suitable private companies, where they exist. However, conditions of access are a concern, as the very poor may lack utility network connections. A pluralistic approach involves consultants in partnership with the water utility, implementing Private Sector Participation where appropriate, with other relevant organizations working with communities. Aid agencies can support utility institutional development.

## Mitigation policies after natural disasters

In natural disaster contexts, institutional development of water utilities is less essential although they still play a major role in any mitigation strategy. Part of this strategy is vulnerability analysis and risk reduction planning. For water or sewerage schemes, this is based on the following parameters:

- Physical: the potential damage to infrastructure
- Operational: estimated capacity for service provision and rehabilitation
- Organizational: water utility capacity, assets, knowledge and experience.

Aid agencies can provide institutional capacity development, support for the protection of network components, emergency equipment and training, and enforcement of norms to adjust technological choices to the prevailing risk. At community level, agencies can assist preparedness initiatives by providing technical and legal advice for implementation of mitigation projects.

## Commitments and time frame

It can be difficult to define when an emergency operation becomes rehabilitation and when, in turn, rehabilitation becomes reconstruction. Consequently, an appropriate time frame for a relief programme may not be designated, with funding allocated on a short-term basis. It is important to clarify this to ensure the long-term sustainability of rehabilitation programmes.

**This briefing note considers the issues surrounding emergency access to water and sanitation following both natural disasters and the impact of conflict, and discusses subsequent approaches to rehabilitation and mitigation.**

## Key references

- Wisner, B. and Adams, J. (2002) *Environmental health in emergencies and disasters. A practical guide*. World Health Organization: Geneva (Figure 1).
- Harvey, P., Baghri, S. and Reed, B. (2002) *Emergency sanitation: assessment and programme design*. Water, Engineering and Development Centre: Loughborough University, UK.
- ICRC (2006) *Water and Habitat*: presentation. [www.icrc.org](http://www.icrc.org) (Figure 2).
- Anderson, M. B. and Woodrow, P. J. (1989) *Rising from the ashes: Development Strategies in Times of Disaster*, First Edition. IT Publishing: London.
- PAHO and AIDIS (2002) *Emergencies and disasters in drinking water supply and sewerage systems: guidelines for effective response*. PAHO: Washington DC. <http://www.paho.org/English/DD/PED/water-intro.pdf>.
- Thomas, A. (2005) *Linking preparedness and performance: the tsunami experience*. Humanitarian Exchange, 32, December, pp. 4-7. <http://www.odihpn.org/documents/humanitarianexchange032.pdf>

**This Briefing Note is based on the full report by Jean-François Pinera available at [www.Lboro.ac.uk/well](http://www.Lboro.ac.uk/well)**

**Briefing Note compiled by Julie Fisher of WEDC**

**Photographs by Peter Harvey, Jean-François Pinera and Bob Reed**

**DFID Resource Centre in Water, Sanitation & Environmental Health [www.Lboro.ac.uk/well](http://www.Lboro.ac.uk/well)**

**For further information, contact: WELL  
Water, Engineering and Development Centre (WEDC)  
Loughborough University  
Leicestershire LE11 3TU UK**

**Email: [WELL@Lboro.ac.uk](mailto:WELL@Lboro.ac.uk)  
Phone: 0 (44) 1509 228304  
Fax: 0 (44) 1509 211079  
Website: <http://www.Lboro.ac.uk/well/>**



**WELL is a network of resource centres:**

WEDC at Loughborough University UK	TREND, Kumasi, Ghana
IRC at Delft, The Netherlands	SEUF, Kerala, India
AMREF, Nairobi, Kenya	ICDDR, B, Dhaka, Bangladesh
IWSD, Harare, Zimbabwe	NETWAS, Nairobi, Kenya
LSHTM at University of London, UK	NWRI, Kaduna, Nigeria

This note was funded by the UK Department for International Development (DFID). The views expressed, however, are not necessarily those of DFID.

Published by WEDC on behalf of WELL